



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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AUG 05 2003  
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Application of:

XU, GU et al.

Serial No.: 10/164,856

Filed: June 7, 2002

PHOTOSENSITIVE RESIN  
COMPOSITIONS FOR COLOR FILTER  
APPLICATIONS

Docket No.: 30108-CNT1

Group Art Unit No.: 1711

Examiner: Susan W. Berman

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DECLARATION

I, Jonathan Mayo, declare and state as follows:

1. I am an employee of Brewer Science, Inc. (hereinafter "BSI") and have been so for about 10 years.
2. The above U.S. patent application, which is a continuation application of Serial No. 09/640,227 (hereinafter "the '227 Patent Application"), filed August 16, 2000, and entitled PHOTOSENSITIVE RESIN COMPOSITIONS FOR COLOR FILTER APPLICATIONS, was filed in my name and the names of GU XU, DAN W. BREWER, TIMOTHY LIMMER, MIKE STRODER, and SHELLY FOWLER as co-inventors.
3. Each of the inventors has assigned all interest in the subject matter of the '227 Patent Application, and any patent to issue therefrom, to BSI by an assignment dated July 27, 2000, which has been recorded in the United States Patent and Trademark Office (reel/frame 011181/0120).
4. BSI developed EXP98088, an experimental composition which included the polymer described in Example 1 of this application. However, the EXP98088 composition was a black

matrix composition rather than a color filter composition as described and claimed in the present application. The "EXP" prefix in EXP98088 prefix denotes "an experimental composition."

5. BSI does not presently possess, nor did it possess during the time of the events described below, in-house testing capability to determine whether its experimental compositions would work in the intended microelectronic devices. Therefore, BSI regularly samples experimental compositions to manufacturers of the microelectronic devices and other testing facilities to determine whether its compositions will work in the actual device.

6. BSI released samples of EXP98088 to each of the following entities to determine whether EXP98088 would work in a microelectronic device:

- On January 20, 1999, to SpatiaLight, Inc. (SpatiaLight);
- On February 17, 1999, to Central Research Laboratories, Ltd. (CRL);
- On May 21, 1999, to North Carolina State University (NCSU); and
- On June 25, 1999, to Science, Technologies & Services, Ltd. (STS).

A copy of the transaction sheet is included as Exhibit A. Each entity received only a one-fourth liter sample except CRL which received two, one-fourth liter samples. BSI received \$350 per one-fourth liter sample from each of these entities to assist in covering the cost of the product. Each of these entities was under a duty, to BSI, of confidentiality.

7. One-fourth of a liter is a very small amount of the product in the industry, and is simply enough for testing purposes. In fact, the final, commercialized products are sold in one liter quantities. A one-fourth liter sample of EXP98088 was sufficient to test approximately 15 to 25 LCDs (liquid crystal displays), and was not enough for manufacturing or commercialization

purposes. This small quantity of EXP98088 was either used completely during testing or discarded after testing.

8. A product data sheet which accompanied each shipment of the sample EXP98088 explicitly states that "EXP98088 is an *experimental* high resistivity ... coating." (emphasis added) The product data sheet is included as Exhibit B. Furthermore, the Material Safety Data Sheet (MSDS) for EXP98088 explicitly states that "[o]nly R&D activities can be carried out with this product." A copy of the MSDS is included as Exhibit C. Each of these exhibits was included with each sample sent to the entities described in paragraph 6 above.

9. BSI was not selling EXP98088, or making any commercialization efforts with respect to EXP98088 during the time period in question. Furthermore, BSI in no way advertised EXP98088 as being for sale during this time period.

10. BSI solicited test data of EXP98088 from the above-referenced companies. Correspondence concerning the test results of EXP98088 is attached herewith as Exhibits D-G, respectively. Certain portions have been blocked out to conceal confidential information that is unrelated to the present application or to the EXP98088 product. Exhibit D demonstrates that BSI solicited test data from CRL regarding EXP98088. In response to this solicitation, CRL described initial problems with streaking and coating of a glass substrate using EXP98088. Exhibit E is a BSI interoffice communication further demonstrating discussion of test results obtained from CRL, e.g., that EXP98088 works for placement on ITO stripes to improve contrast of organic EL displays.

Also included is Exhibit F, wherein NCSU described problems with developing and breaking out of EXP98088 during etching. NCSU sent scanning electron microscope photographs illustrating

these problems (included within Exhibit F). Finally, Exhibit G is BSI's interoffice correspondence discussing EXP98088 test results obtained from Shellcase Ltd. (Shellcase). Shellcase was the recipient of the above-referenced EXP98088 samples released to STS. Exhibit G discusses the limited success of EXP98088 in the Shellcase devices because EXP98088 suffered from low optical density. This correspondence was circulated to myself and others involved in the research and development of EXP98088.

11. BSI released samples of EXP98088 to the above-referenced entities in order to determine whether the experimental composition worked for its intended purpose, and this could not be determined in-house. BSI could *not* determine that EXP98088 worked for its intended purpose until after the test data and feedback were received.

I further declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that wilful, false statements and the like are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code, and such wilful false statements may jeopardize the validity of any patents issued from the patent application.

Serial No. 10/164,856

Docket No. 30108-CNT1

Any fee which is due in connection with this Declaration should be applied against Deposit

Account No. 19-0522..

Jonathan Mayo.  
Jonathan Mayo

Date: June 14, 2002

## Despatched Sales History Report - BSI Confidential

Our part number	Part description	Customer Code and Company Name	Despatch date	SO Price	Quantity	\$ Value
S.O. No. Invoice Line By	Customer Ref.					
B70916-00	DARC EXP98088, 140g					
006817 006901 1	DJB SAMPLE	BEC01P (Allen Technology Corporation)	10/20/98	0.00	0.1 Kg	0.00
006816 006902 1	DJB SAMPLE	AND01P (Anorad Corporation)	10/20/98	0.00	0.1 Kg	0.00
Total Liters, average price, quantity, and value for B70916-00 (DARC EXP98088, BULK):						
			0.00 Liters	\$ 0.00	0.3 Kg	\$ 0.00
B70916-52	DARC EXP98088, 250g					
007332 007457 1	MC 3021	SPA01P (Spatialight, Inc.)	01/20/99	350.00	2.0 Each	0.00
				0.00	1.0 Each	0.00
				0.00	1.0 Each	0.00
				0.00	1.0 Each	0.00
				0.00	2.0 Each	0.00
				0.00	1.0 Each	0.00
				0.00	2.0 Each	0.00
				350.00	1.0 Each	350.00
007505 007627 1	DJB 000029150	CRN01P (Central Research Laboratories, Ltd)	02/17/99	350.00	2.0 Each	700.00
				0.00	4.0 Each	0.00
				0.00	4.0 Each	0.00
				0.00	2.0 Each	0.00
008009 008160 1	MC 80928438	NOR02P (North Carolina State University)	05/21/99	350.00	1.0 Each	350.00
				0.00	1.0 Each	0.00
				0.00	1.0 Each	0.00
				0.00	1.0 Each	0.00
008254 008378 1	MC 891001	STR01P (Science, Technologies & Services Ltd.)	06/25/99	350.00	1.0 Each	350.00
				0.00	1.0 Each	0.00
				0.00	1.0 Each	0.00
				0.00	1.0 Each	0.00
				0.00	2.0 Each	0.00
				0.00	1.0 Each	0.00
				0.00	1.0 Each	0.00
Total Liters, average price, quantity, and value for B70916-52 (DARC EXP98088, 250g):						
			9.00 Liters	\$ 58.33	36.0 Each	\$ 1,750.00



## Sorted By Part Number

## Shipping Charges Are Not Included In Report

Selection ranges: S.O. Number from " " to "ZZZZZZ", Despatch Date "OCT 1, 1998" to "SEP 30, 1999", Invoice Number " " to "ZZZZZZ",

Part Number "B70916" to "B70916-54", Part Index Code 1 " " to " ", Customer Code " " to " ", Customer Index Code 1 " " to " ",

Sales Account Code " " to " ", Customer Order Reference " " to " ", Additional User Reference " " to " "

End of Report

29 records out of 4597 printed from SAHFILE.

# Application Note

## EXP98088

EXP98088 is an experimental high resistivity, high optical density, photo-imageable coating developed for applications in the flat panel display and sensor industries.

### Application Process and Characteristics:

Coating EXP98088 This can be done using conventional spin coating techniques. Although it is not necessary, APX-K1 as an adhesion promoter may be used. Static dispense and point of use filtration are also recommended.

Solvent Bake The solvent bake parameters play an important role in determining the develop and adhesion properties of the film. The best results have been obtained with a solvent bake temperature range of 80°C - 100°C for times ranging from 3 - 6 minutes. These parameters are dependent upon substrate size, film thickness, and rinse pressure. Therefore, they should be optimized on a process by process basis.

Expose No photoresist application is necessary as EXP98088 acts as a negative resist. Exposure doses may vary between photo towers, but it has been found that a dose of  $\sim 500 \text{ mJ/cm}^2$  (measured at i-line) from a broad band UV source is usually sufficient to cure a 1 $\mu\text{m}$  film. More energy may be necessary for thicker films.

Develop EXP98088 will develop to the correct exposed dimensions in 45 - 60 seconds in Brewer Developer (EXP97062). The time needed to develop this product depends on solvent bake time and temperature, as well as developer temperature and developer age. The develop time should be optimized on a process by process basis.

Rinse EXP98088 should be rinsed well with a moderate pressure spray of DI water immediately following develop. It is imperative that the spray be strong enough to remove any partially developed fringe that may still be attached to the pattern.

Final Cure EXP98088 should be cured at 230°C for 60 minutes in a forced-air oven, however temperatures as low as 190°C and as high as 250°C are acceptable.

### Clean-up:

EXP98088 can be cleaned up with NMP or acetone.

### Shelf Life:

7 days at room temperature  
3 months at -10°C

# Brewer Science, Inc.

2401 Brewer Drive • Rolla, Missouri 65401 USA  
(tel.) 573-364-0300 • (fax) 573-368-3318 • [www.brewerscience.com](http://www.brewerscience.com)



OPTICAL MATERIALS DIVISION

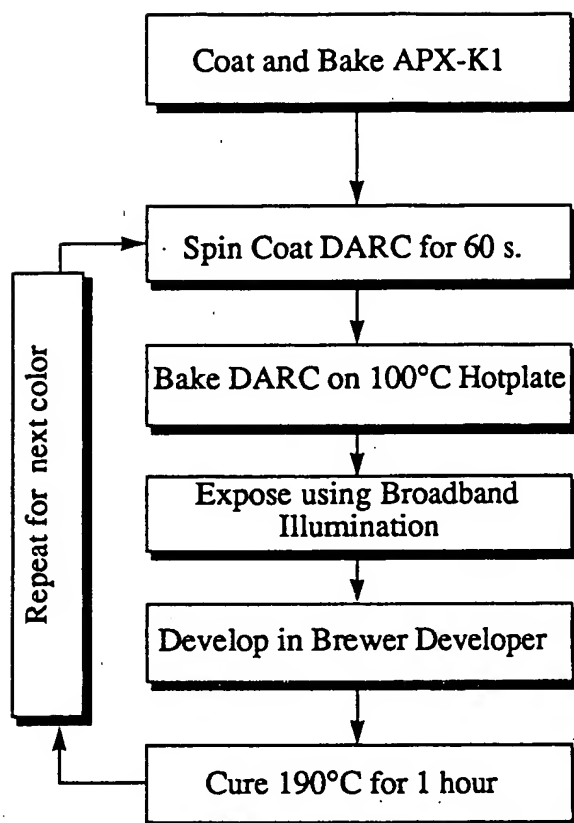




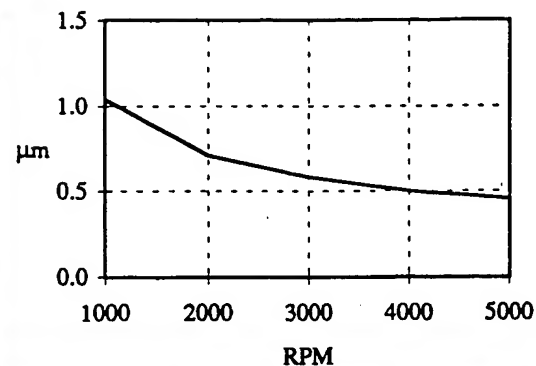
*Optical  
Materials  
Division*

**Brewer Photosensitive Color  
EXP98088**

**Process Steps**

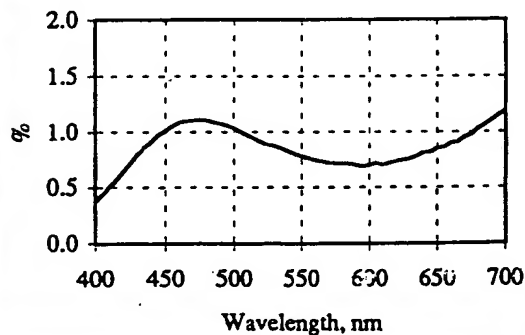


**Spin Speed**



**Transmittance**

Film thickness: 1.0 µm



**Brewer Science, Inc.**  
2401 Brewer Drive  
Rolla, MO 65401 USA

Phone: (573) 364-0300  
Fax: (573) 368-3318

**Process Details**

RH: 40% - 50%; Temp. 22°C - 24°C

APX-K1 coat and bake: see application notes for that product.

Soft bake: 100°C for 60 seconds on hot plate

Exposure: 300 mJ/square cm.

**Physical Properties**

VISCOSITY(Brookfield)  
10-20 cps @ 37.8°C

OPTICAL DENSITY  
1.8 - 2.0 @ 540 nm

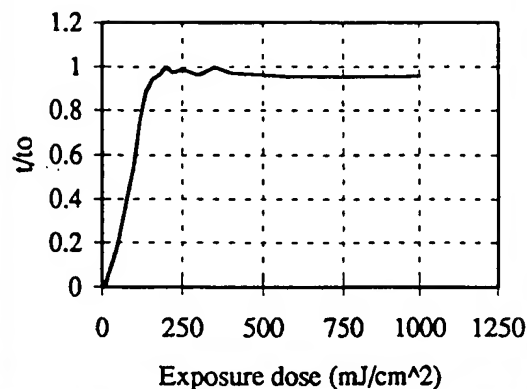
SURFACE ROUGHNESS  
5 nm (ANSI B46.1-1978)

RESISTIVITY (ASTM D257-93)

Volume:  $10^{12} \Omega\text{-cm}$   
Surface:  $10^9 \Omega/\text{sq}$

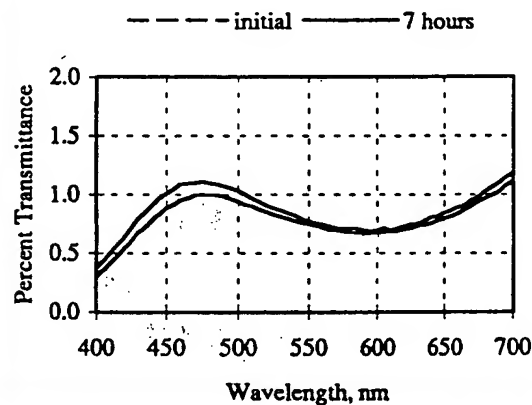


## Exposure Contrast



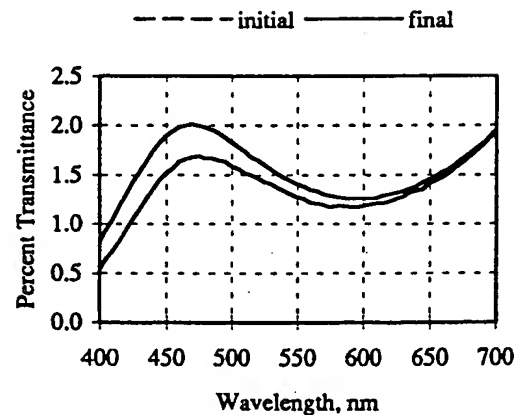
## Thermal Stability

7 hours @ 230°C in air



## Light Stability

19 million lux-hrs in air



EXP98088

**Shelf Life:** 1 week when stored at 22°C, -10°C to 0°C storage stability not yet determined.

All exposure dose numbers reported were measured using an OAI Model 206 UV Power Meter with an i-line detector. Different equipment may produce different minimum exposure doses.

Process notes are for a 1.0  $\mu\text{m}$  film. Results will vary for different film thicknesses.

DISCLAIMER: All statements, technical information and recommendations contained herein are based on tests we believe to be accurate, but the accuracy or completeness thereof is not guaranteed and the following is made in lieu of warranty expressed or implied. Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising from the use or inability to use the product. Before using, user assumes all risk and liability whatsoever in connection therewith. No statement shall have any force or effect unless in an agreement signed by officers of seller and manufacture.

P.9.4.4118.20.3 2.16.99 Q&D121

**BREWER SCIENCE INC.  
MATERIAL SAFETY DATA SHEET**

This Material Safety Data Sheet has been prepared to comply with the EC Directive, Canadian WHMIS and the OSHA Hazard Communication Standard.

**SECTION 1: IDENTIFICATION**

Product Name: DARC EXP98088

Manufacturer: Brewer Science, Inc.  
2401 Brewer Dr.  
Rolla, MO 65401-6901

Information Phone Number: (573) 364-0300

Fax: (573) 368-3318

Emergency Phone Number: (800) 255-3924

MSDS Date of Preparation: 10/15/98

**SECTION 2: HAZARDOUS COMPONENTS**

This product is an experimental material and its specific chemical composition is under development. It may contain any or all of the following hazardous chemicals and other proprietary materials not disclosed. The following hazard information is estimated as the physical and toxicological properties have not been fully evaluated. Handle with caution.

Component	CAS#	Percent	Exposure Limits
Cyclohexanone	108-94-1	20-40	50 ppm PEL-TWA 25 ppm TLV-TWA skin
n-Methyl-2-pyrrolidone	872-50-4	10-30	None Established (PEL/TLV) 100 ppm (recommended) 250 ppm TLV-STEL skin
Crosslinking Agent	Proprietary	0-10	None Established (PEL/TLV)
Polymer solids	Proprietary	10-30	None Established (PEL/TLV)
Dye solids	Proprietary	10-30	None Established (PEL/TLV)
Surfactants	Proprietary	0-10	None Established (PEL/TLV)

→ This product may contain substances that are not listed on the EPA Toxic Substances Control Act Inventory. Only R&D activities can be carried out with this product and such activities must be performed by or under the direction of a technically qualified individual. See Section 15 for additional information.

**SECTION 3: HAZARDS IDENTIFICATION**

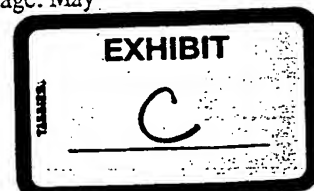
**EMERGENCY OVERVIEW**

This product may be flammable. May cause eye and skin irritation. Inhalation of vapors may cause mucous membrane and respiratory irritation, headache, dizziness, nausea and other symptoms of central nervous system depression. Prolonged overexposure may cause lung, liver, kidney, heart, nervous system and eye damage. May contain chemicals that are suspected to cause cancer, reproductive damage and/or birth defects.

**Potential Health Effects:**

Eye: May cause moderate to severe irritation with possible permanent damage.

Skin: May moderate to severe irritation. Prolonged or repeated exposure may cause defatting and dermatitis. May



contain chemicals that are absorbed through the skin causing effects similar to those described under inhalation. May contain chemicals that cause skin sensitization and allergic skin reaction.

Inhalation: Inhalation of vapors, mists or aerosols may cause mucous membrane and respiratory irritation. Central nervous system depression with symptoms of headache, dizziness, nausea, drowsiness and unconsciousness may also occur.

Ingestion: Swallowing may cause central nervous system depression with headache, nausea, dizziness and unconsciousness; gastrointestinal irritation, abdominal pain and injury to the lungs, liver, kidney, heart, nervous system, visual system and brain.

Chronic Hazards: Chronic absorption may cause damage to the eyes, heart, lungs, nervous system, liver and kidneys. May contain a chemical that has been reported to cause adverse reproductive effects in laboratory animals. This product may contain a chemical that is suspected to be carcinogenic based on studies with laboratory animals.

Carcinogen Status: This product may contain a chemical that is listed as a carcinogen by OSHA, IARC or NTP.

Medical Conditions Aggravated by Exposure: Pre-existing skin, liver and kidney diseases.

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#### SECTION 4: FIRST AID MEASURES

Eye: Rinse thoroughly with water for at least 15 minutes, holding the eye lids open to be sure the material is washed out. Get immediate medical attention.

Skin: Remove contaminated clothing. Wash contact area thoroughly with soap and water. Get medical attention if irritation or symptoms of exposure develop. Launder clothing before re-use. Contaminated leather articles that cannot be decontaminated, including shoes, must be destroyed.

Inhalation: Remove victim to fresh air. Give artificial respiration if needed. Get immediate medical attention.

Ingestion: Do not induce vomiting unless directed to do so by medical personnel. Keep the victim calm and warm. Get immediate medical attention.

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#### SECTION 5: FIRE AND EXPLOSION DATA

Flash Point: Not Available

Flammable Limits: Not Available

Extinguishing Media: Use water fog or spray, universal foam, carbon dioxide or dry chemical.

Special Fire Fighting Procedures: Wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water.

Unusual Fire Hazards: Vapors may be heavier than air and may travel along surfaces to remote ignition sources and flash back.

Hazardous Decomposition Products: Oxides of carbon, sulfur and nitrogen, unknown materials.

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#### SECTION 6: ACCIDENTAL RELEASE MEASURES

Spill: Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing to prevent eye and skin contact including impervious gloves, safety goggles and respirator if needed. Ventilate area. Cover with and inert absorbent material and collect into an appropriate container for disposal. Report spills and releases as required to appropriate authorities.

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#### SECTION 7: HANDLING AND STORAGE

Handling: Avoid breathing vapors, aerosols and mists. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Always wear impervious gloves, chemical safety goggles and protective clothing when handling this material. Wash thoroughly after handling. Do not eat, drink or smoke in the work area. Keep product away from heat, sparks, flames and all other sources of ignition. No smoking in storage or use areas. Keep containers closed when not in use.

Storage: Store in a cool, dry, well-ventilated location away from incompatible materials. Keep containers closed when not in use.

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## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation: Use with adequate general or local exhaust ventilation to maintain exposure levels below the occupational exposure limits.

Respiratory Protection: Wear an appropriate NIOSH/MSHA approved respirator. A self-contained or atmosphere supplying respirator is recommended. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

Skin Protection: Impervious gloves are required.

Eye Protection: Chemical safety goggles or face shield required.

Other Protective Equipment: Impervious clothing is required to prevent skin contact and contamination of personal clothing. An eye wash facility and safety shower should be available in the work area.

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Not available. This is an experimental product.

pH: Not available

Boiling Point: Not available

Vapor Pressure: Not available

Vapor Density: Not available

Specific Gravity: Not available

Melting Point: Not available

Water Solubility: Not available

Evaporation Rate: Not available

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## SECTION 10: STABILITY AND REACTIVITY

Stability:

Stable: X

Unstable:

Incompatibility/Conditions to Avoid: Strong oxidizing agents, strong acids, strong alkalis, reducing agents. Do not mix with any other chemical unless directed to do so by Brewer Science, Inc. Chemical compatibility has not been established. Keep away from heat, sparks, flames and other sources of ignition.

Hazardous Decomposition Products: Oxides of carbon, sulfur and nitrogen, unknown materials.

Hazardous Polymerization: May Occur: X Will not occur:

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## SECTION 11: TOXICOLOGICAL INFORMATION

No toxicity data is available for this product at this time.

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## SECTION 12: ECOLOGICAL INFORMATION

No ecotoxicity data is available for this product at this time.

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### SECTION 13: DISPOSAL INFORMATION

Dispose in accordance with all local, state and federal regulations.

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### SECTION 14: TRANSPORT INFORMATION

No data is available at this time.

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### SECTION 15: REGULATORY INFORMATION

#### U.S. FEDERAL REGULATIONS:

CERCLA 103 Reportable Quantity: Not available.

#### SARA TITLE III:

Hazard Category for Section 311/312: Not determined.

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements: Not determined.

Section 302 Extremely Hazardous Substances (TPO): Not determined.

EPA Toxic Substances Control Act (TSCA) Status: This product may be subject to restrictions and prohibitions listed in Section 5 of the Toxic Substances Control Act (TSCA). One or more components may not be listed on the TSCA inventory. Only R&D activities may be carried out with this product and such activities must be performed by or under the direction of a technically qualified individual as defined in 40CFR 720.36. Export of this product may be subject to TSCA Section 12 (b) Export Notification requirements.

#### STATE REGULATIONS:

California Proposition 65: These products contain the following substances known to the State of California to cause cancer and/or reproductive harm: Not determined.

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### SECTION 16: OTHER INFORMATION

No data available at this time.

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This above information is believed to be correct but does not propose to be all inclusive and shall be used only as a guide. Brewer Science shall not be held liable for any damage resulting from handling or from contact with the above product.

COPY

From: Melinda Cochran (4/7/99)  
To: John Berges, Jonathan Mayo

FWD>Re: EXP98088 DARC

99-04-07 09:56:49

FYI

Date: 4/7/99 6:39 AM

From: Alan Mosley

Dear Melinda

Thank you for your message. The material arrived safely and we are using it to spin coat 3" x 4", 0.4 mm thick glass. We do not pattern the material. After some initial problems with streaking and coating the underside of the glass, we are now obtaining good quality coatings by using a slower spin speed of 1500 rpm.

Regards

Alan

CRL  
RE: EXP98088

Reply Separator

Subject: EXP98088 DARC

Author: Melinda Cochran <mcochran@brewerscience.com> at INTERNET-MAIL

Date: 06/04/99 16:47

Subject:

Time: 4:37

PM

OFFICE MEMO

EXP98088 DARC

Date:

4/6/99

Dear Alan:

Sometime ago, CRL placed an order with Brewer Science for 2 x 250g of EXP98088 DARC. This material was sent from our facility on 15 Feb. 99 to CRL and I trust that it arrived safely at your facility.

Would it be possible to inform us if this material has been evaluated and if so, the results which were obtained? This information is always helpful to us.

Thank you, in advance, for your assistance and we look forward to hearing from you soon.

Best regards,

Melinda Cochran

RFC-822 Header:

Received: from spitfire.crl.co.uk by relay6.UU.NET with ESMTP  
(peer crosschecked as: spitfire.crl.co.uk [193.114.56.237])

id QQgjwul4599

for <mcochran@brewerscience.com>; Wed, 7 Apr 1999 05:03:43 -0400 (EDT)

Received: from crl.co.uk (thunderstorm.crl.co.uk [193.114.56.87])  
by spitfire.crl.co.uk (8.8.5/8.8.5) with SMTP id JAA22051

for <mcochran@brewerscience.com>; Wed, 7 Apr 1999 09:03:58 +0100

Received: from ccMail by crl.co.uk (ccMail Link to SMTP R8.30.00.7)  
id AA923475491; Wed, 07 Apr 1999 09:58:13 GMT

Message-Id: <9904079234.AA923475491@crl.co.uk>

X-Mailer: ccMail Link to SMTP R8.30.00.7

Date: Wed, 07 Apr 1999 09:56:49 GMT

From: "Alan Mosley" <uunet@crl.co.uk!amosley>

To: <uunet@brewerscience.com!mcochran>

Subject: Re: EXP98088 DARC

MIME-Version: 1.0

Content-Type: text/plain; charset=US-ASCII

EXHIBIT

D

From: Jonathan W. Mayo (5/18/99)

To: Patti Shaw

CRL Meeting

Good Morning Patti:

99-05-17 22:43:49

I had a dinner meeting with Alan Mosley last night.

He confirmed Drew's news that dpiX had been bought out. He didn't know who by but said there was a press release about it today (Monday).

The EXP98088 we sent him works fine for what he does with it. He puts it on top of the ITO stripes to improve the contrast of the organic EL display. He doesn't pattern it which is probably why it still works.

CRL

RE: EXP 98088

That's it for now.

Best regards,

Jo

## RFC-822 Header:

Received: from delta.rollanet.org by chi6s0srv11.alter.net with SMTP  
(peer crosschecked as: delta.rollanet.org [208.18.12.6])  
id QQgptf03814  
for <pshaw@brewerscience.com>; Tue, 18 May 1999 15:45:04 GMT  
Received: (qmail 408 invoked from network); 18 May 1999 15:43:32 -0000  
Received: from access-7-48.rollanet.org (HELO 208.18.13.49) (208.18.13.49)  
by mx-old.rollanet.org with SMTP; 18 May 1999 15:43:32 -0000  
Message-ID: <37417DA6.57B0@rollanet.org>  
Date: Mon, 17 May 1999 22:43:49 -0700  
From: "Jonathan W. Mayo" <uunet!rollanet.org!mayos>  
X-Mailer: Mozilla 3.01 (Macintosh; I; PPC)  
MIME-Version: 1.0  
To: Patti Shaw <uunet!brewerscience.com!pshaw>  
Subject: CRL Meeting  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

EXHIBIT

E

From: Chris Boney (6/15/99)  
To: uunet!brewerscience.com!jomayo

DARC jpgs

99-06-15 11:28:30

Hi Jonathon. I have attached 3 jpg pictures illustrating the problems we see. I hope this will help.  
The images (000,001,002) are:

000 - DARC openings not developing out but breaking out. The openings should be gold underneath, but seem bluish. APX was used on this sample, and the bake times may have been a little long.

001 - DARC opening not developing out at all, but there is a definite color and texture change in the exposed and unexposed areas.

002 - Upper right area (exposed) is staying nicely, but all else should be developing away and is not. APX was not used on this sample and the soft bake was at 90C for 1min or less. This is the same sample as shown in ic002.

I'll talk to you at 1:15pm your time.

Chris Boney

FC0822 Header:

-----  
Received: from uni02mr.unity.ncsu.edu by chi6sossrv11.alter.net with ESMTP  
(peer crosschecked as: uni02mr.unity.ncsu.edu [152.1.1.165])  
id 00gtso00518  
for <jomayo@brewerscience.com>; Tue, 15 Jun 1999 15:30:59 GMT  
Received: from mbepcf.physics.ncsu.edu (mbepcf.physics.ncsu.edu [152.1.119.14])  
by uni02mr.unity.ncsu.edu (8.8.8/8.8.8/UR01Feb99) with ESMTP id LAA27768  
for <jomayo@brewerscience.com>; Tue, 15 Jun 1999 11:28:58 -0400 (EDT)  
Message-Id: <199906151528.LAA27768@uni02mr.unity.ncsu.edu>  
From: "Chris Boney" <uunet!unity.ncsu.edu!jcboney>  
To: <uunet!brewerscience.com!jomayo>  
Subject: DARC jpgs  
Date: Tue, 15 Jun 1999 11:28:30 -0400  
X-MSMail-Priority: Normal  
X-Priority: 3  
X-Mailer: Microsoft Internet Mail 4.70.1155  
X-MIME-Version: 1.0  
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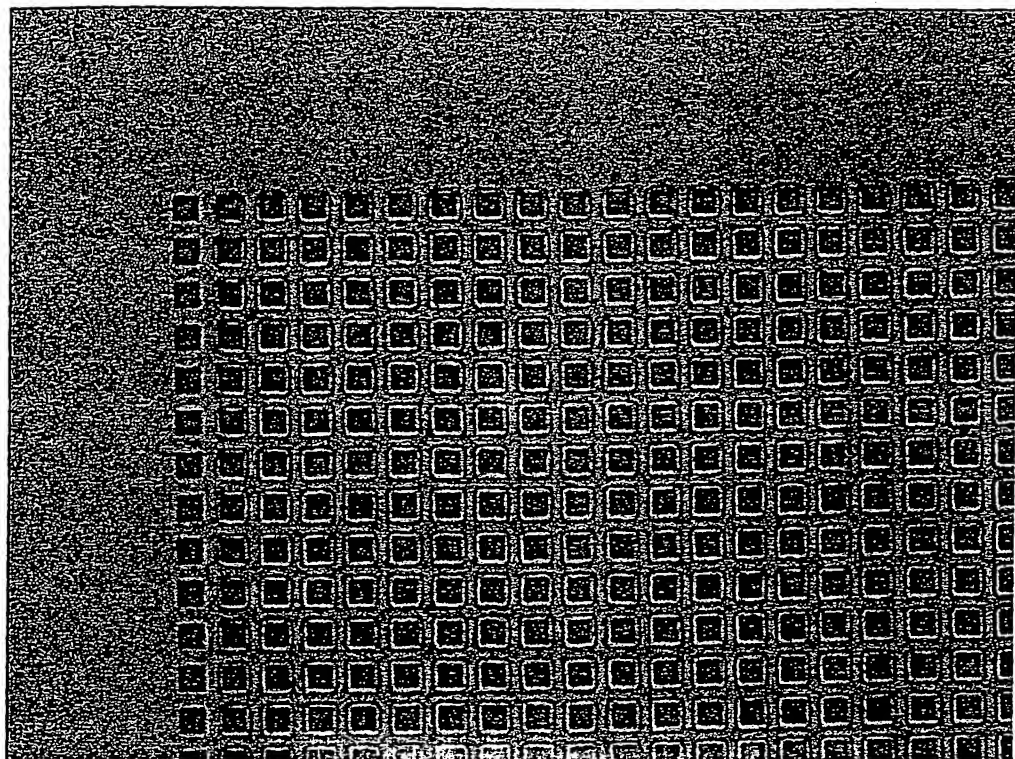
NCSU

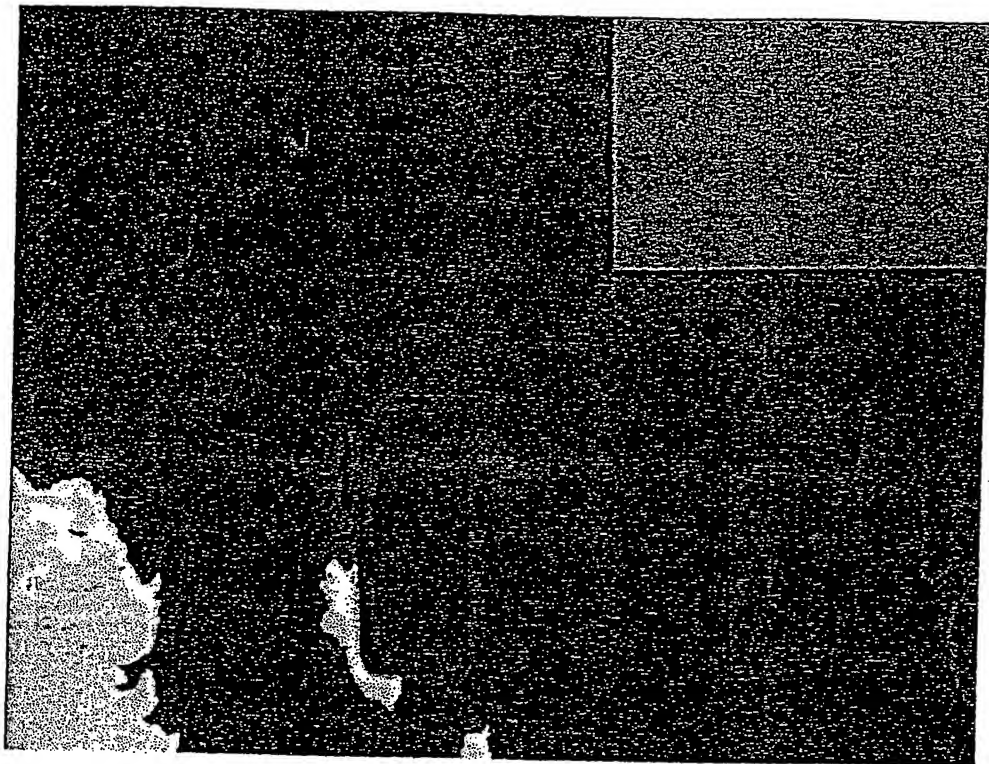
RC: Exp  
98088

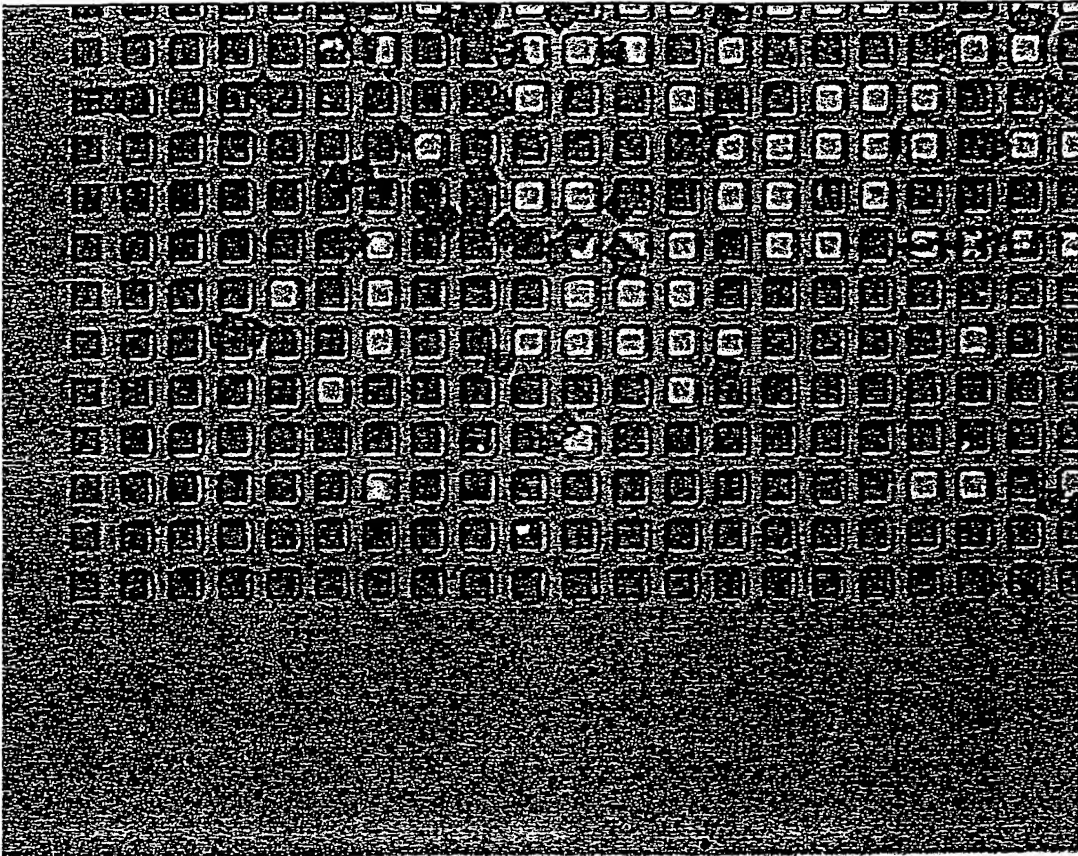
EXHIBIT

F









From: Jonathan Mayo (7/20/99)

To: Nahum Adan,

CC: Gary Brand, Dan Brewer, Melinda Cochran, Paula Crews, Norm Dobson, Tom Evers, Tony Flaim, Shelly Fowler, Dan Hawley, Edie Hays, Denise Howard, Tim Limmer, Amanda Lortz, Renee Mahaney, Ram Sabnis, Claudia Scott, Patti Shaw, Julie Snook, May Snook, Mike Stroder, Keith Swallow, Debbie Thomas, Paul Woods, Ed Wrasmann, Gu Xu

Reply to: RE>Re: Color Filter Materials

Dear Nahum:

Thanks for the swift reply. We will be pleased to send someone to Tower to give a presentation. It will most likely be me.

Thank for the update on Shellcase.

Best regards,

Jo

Date: 7/20/99 7:42 AM

To: Jonathan Mayo

From: Nahum Adan

Dear Jo

[REDACTED]

s for Shellcase, they were quite successful in the first attempt to work with EXP 98088. Currently, only one customer required a black frame in their SP, so we do not have a good estimate for the potential of the product. I'll update you once I have more info.

Best regards  
Nahum

-----Original Message-----

From: Jonathan Mayo <jomayo@brewerscience.com>

To: Nachum Adan <STSLTD@MAIN.AQUANET.CO.IL>

Cc: Patti Shaw <pshaw@brewerscience.com>

Date: EAT TET E, EAT E 20, 1999 01:00

Subject: Color Filter Materials

Subject:

Time: 5:02

M  
OFFICE MEMO  
7/19/99

Color Filter Materials

Date:

Dear Nachum:

How are things going with you? Apart from being a little too hot now in Missouri, things are going quite well for us.

[REDACTED]

so, what is the situation with Shellcase and our black product?

Best regards,

Copy

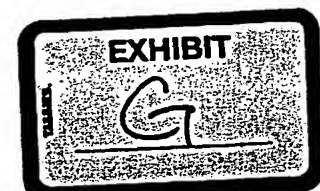
RE: EXP 98088

OK

F. 24

J3

7/22  
←



From: Patti Shaw (9/7/99)  
To: Gary Brand, Melinda Cochran, Tom Evers, Dan Hawley, Tim Linner,  
Claudia Scott, Paul Williams, Ed Wrasmann  
CC: Jonathan Mayo  
Shellcase & ELTA Trip Reports - jm  
Trip Report - Jonathan Mayo

Shellcase and ELTA - Israel  
September 7, 1999

Two more visits today:

1. Shellcase

For Shellcase: Avner Badihi, VP Technologies  
Itzik Shweky, R&D Department  
Ragit Gershtenman, Process & Integration Engineer  
Gil Mador, Process Engineer  
Moshe Krinan, Product Manager (no card)

For STS: Itzik Roman

For BSI: Jonathan Mayo

This meeting was quite useful. Two main things that came out of it are:

a) DARC. They need to pattern fairly gross lines, 1 to 2 mm wide, on the outer surface of their packages. They have tried EXP98088 with some success, but would probably be better off with EXP99019V.



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

DARC

They showed me the samples that they had patterned. They were quite pleased with the patterning but said the OD was too low. On examination, these parts obviously suffered from lack of film retention. They used



*Copy*

*RE: EXP98088*

By: Tim Limmer 9/14/99 9:46 AM

Page: 2

From: Patti Shaw (9/7/99)

To: Gary Brand, Melinda Cochran, Tom Evers, Dan Hawley, Tim Limmer, Claudia Scott, Paul Williams

CC: Jonathan Mayo

BCC:

Priority: Normal

Date s nt: 9/7/99 2:24 PM

[REDACTED]

DARC

They showed me the samples that they had patterned. They were quite pleased with the patterning but said the CD was too low. On examination, these parts obviously suffered from lack of film retention. They used about 300 mJ.cm<sup>-2</sup>, supposedly measured at i-line and 100°C HP bake for soft bake. I recommended doubling or tripling the exposure dose. The other complaint they had was that it required up to 4 minutes in developer (EXP97062) to clean out the open areas. They are using the developer at 18°C. I suggested heating it to 22°C.



Resistivity is not an issue for them. Tim, do you think they would be better off using EXP99019V? How about arranging for Curt to do a blind comparison of 019V and 088 to see which has the most robust process? If 019V wins, it would be a good plan to send a sample to STS to pass on to Shellcase.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]